

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1.(currently amended): A cooler system, said cooler system including a heat exchanger, said heat exchanger including a case member enclosing a wet side in heat exchange relationship with a dry side, said wet and dry sides being substantially hermetically sealed from one another, said cooler system comprising:

forcing a first stream of input air through said dry side to produce a stream of cooled air;

forcing ~~at least two streams~~ a stream of input air into said wet side ~~from different locations~~ to form a mass of turbulent air, allowing said mass of turbulent air to escape from said wet side, and maintaining a mass of distributed water on said wet side to humidify said mass of turbulent air and to produce a stream of humidified air;

combining said streams of cooled and humidified air at a location remote ~~from~~ from said dry side and outside of said wet side to produce a combined mass of air, said combined mass of air having a combined relative humidity; and,

delivering said combined mass of air from where said combining occurs to a discharge site, and discharging said combined mass of air from said site to a desired confined location within an ambient environment exterior to said confined location, said ambient environment having an ambient relative humidity of less than approximately 40 percent and a temperture of greater than approximately 95 degrees Faherenheit, said confined location having a confined relative humidity, said combined relative humidity being controlled to approximately a value that allows said confined relative humidity to remain at a value below approximately 60 percent.

2.(currently amended): A cooler system of claim 1 including drawing at least a part of said stream of input air ~~for at least one of said streams of input air~~ from said combined mass of air after being delivered to said desired confined location.

3.(currently amended): A cooler system of claim 1 wherein said desired confined location is within the interior of a structure and said structure has an exterior, said interior has a volume and there is at least one opening having a total area of at least approximately 6 square inches substantially unobstructed to the flow of air between said interior and said exterior.

4.(previously presented): A cooling assembly comprising:

a heat exchanger, said heat exchanger including a case member enclosing a wet side in heat exchange relationship with a dry side, said sides being substantially hermetically sealed from one another;

a first air moving member adapted to move air through said dry side to produce a cooled stream of air;

a liquid distributing member within said wet side;

a liquid sump element associated with said wet side and adapted to receive liquid from said wet side and to make said liquid available to said liquid distributing member;

at least two air moving members adapted to move air through said wet side from different locations to produce a humidified mass of turbulent air on said wet side, said humidified mass of turbulent air including a liquid phase of said liquid;

conduit members adapted to combine said cooled stream of air and said humidified mass of turbulent air at a location remote from said dry side and deliver the resultant combined stream of air to the interior of a structure.

5.(cancelled)

6.(previously presented) A cooling assembly of claim 4 including a power source poweringly associated with said air moving members, said power source including an ambient energy harvesting member.

7.(original): A cooling assembly of claim 4 wherein said liquid distributing member includes a pump and a spray head.

8.(previously presented): A cooling assembly :

a heat exchanger, said heat exchanger including a case member including a wet side in heat exchange relationship with a dry side, said wet and dry sides being substantially hermetically sealed from one another;

a first air moving member adapted to moving air through said dry side to produce a cooled stream of air;

a humidifying system air humidifyingly associated with said wet side;

at least two air moving members adapted to moving air through said wet side from different directions to produce a humidified mass of turbulent air on said wet side, said air moving members requiring electrical power for their operation;

conduit members adapted to combine said cooled stream of air and said humidified mass of turbulent air at a location remote from said dry side and deliver the resultant combined stream of air to the interior of a structure;

a secondary battery system, said secondary battery system being adapted to supplying all of said electrical power; and

an ambient energy harvesting system chargingly associated with said secondary battery system.

9.(previously presented): A cooling assembly according to claim 8 wherein said at least two air moving members being adapted to drawing air from said interior.

10.(previously presented): A cooler installation for use in low humidity high temperature environments comprising:

a structure having an interior containing ambient air;

a tube and shell heat exchanger coolingly associated with said interior, said tube and shell heat exchanger including a case member confining a dry tube side and a wet shell side in heat exchanging relationship with one another;

a dry side air moving member air movingly associated with said dry side and adapted to move said ambient air through said dry side and to provide a dry side air stream;

a plurality of wet side air moving members air movingly associated with said wet side, and adapted to move air through said wet side from different directions and to provide a wet side air stream; and

a water supply system humidifyingly associated with said wet side, said cooling installation being adapted to discharge said dry side and wet side air streams into said interior, said cooling installation being adapted to combine said dry side and wet side air streams before said discharge.

11.(cancelled)

12.(original): A cooling installation of claim 10 including a secondary battery system poweringly associated with said shell and tube heat exchanger, and an ambient energy harvesting system chargingly associated with a secondary battery system.

13.(original): An air conditioning installation according to claim 10 wherein said cooling installation is adapted to cooling said ambient air on both said dry and wet sides.

14.(original): An air conditioning installation according to claim 10 wherein said tube side is substantially hermetically sealed from said shell side, and said tube and shell heat exchanger is adapted to allowing heat to flow from said dry side to said wet side.

15.(currently amended): A process of air conditioning the interior of a structure, said interior having an interior relative humidity, said structure being located within an exterior environment, said process comprising:

selecting a time when said exterior environment exhibits a temperature in excess of approximately ~~90~~ 100 degrees Fahrenheit and a relative humidity of less than approximately ~~40~~ 35 percent;

selecting a heat exchanger including a case member having a wet side in heat exchange relationship with a dry side, said sides being substantially hermetically sealed from one another, and locating said heat exchanger in air conditioning association with said interior;

establishing a mass of distributed water on said wet side;

establishing a flow of ~~turbulent air introduced from different directions~~ through said wet side in contact with said mass of distributed water, and recovering a resulting stream of moist air;

establishing a flow of air through said dry side, allowing heat to flow from said dry side to said wet side, and recovering a resulting stream of cooled air;

combining said streams of moist and cooled air at a location remote from said dry side and outside of said wet side to produce a stream of combined air; ~~and~~

discharging said stream of combined air into said interior at a place different from said location, said stream of combined air having a combined relative humidity; and,

maintaining said combined relative humidity at a value that maintains said interior relative humidity at a value of less than approximately 60 percent.

16.(currently amended): A process of air conditioning the interior of a structure according to claim 15 including selecting a time when said exterior environment exhibits a relative humidity of less than approximately 25 percent, and ~~establishing a~~ maintaining said interior relative humidity ~~in said interior of~~ at no more than approximately 50 percent.

17.(original): A process of air conditioning the interior of a structure according to claim 15 wherein said establishing a mass of distributed water comprises providing a body of water, moving water from said body of water to said wet side and distributing the resulting moved water within said wet side to form said mass of distributed water, and recycling said mass of distributed water to said body of water.

18.(original): A process of air conditioning the interior of a structure according to claim 15 including selecting a time when said exterior environment exhibits a relative humidity of less than approximately 25 percent and a temperature of greater than approximately 110 degrees Fahrenheit, and allowing said process of air conditioning to establish a temperature difference of at least approximately 20 degrees Fahrenheit between said ambient air and said exterior environment.

19.(previously presented): A process of air conditioning the interior of a structure according to claim 15 wherein said establishing a flow of air through said dry side includes drawing air from said interior.

20.(currently amended): An air conditioning system for the interior of a structure, said air conditioning system including a heat exchanger, said heat exchanger including a shell side in heat exchanging relationship with a tube side, said air conditioning system comprising:

forcing ~~ambient air from said interior~~ through said tube side to produce a stream of cooled air;

forcing ~~ambient air from at least two different locations~~ through said shell side and maintaining a mass of distributed water on said shell side to produce a stream of humidified air; and

allowing said streams of cooled and humidified air to combine to produce a combined mass of air at a location remote from said tube side and outside of said shell side, and conducting said combined mass of air to a site ~~said interior~~ that is spaced from said location, and releasing said combined mass of air from said site into said interior.

21.(currently amended): An air conditioning assembly for cooling the interior of a structure, said air conditioning assembly including a heat exchanger, said heat exchanger including a wet side with a ~~plurality of wet side~~ inlet inlets and a wet side outlet, and a dry side having a dry side inlet and a dry side outlet, said wet side being in heat exchanging relationship to said dry side, said air conditioning system comprising:

a ~~plurality of wet side air moving member members associated with said plurality of wet side inlets~~ and air movingly associated with said wet side;

a dry side air moving member air movingly associated with said dry side; and

a water source water supplyingly associated with said wet side, said wet side being configured to form finely divided water, said dry side outlet being configured to discharge air from said dry side into a conduit, said wet side outlet being configured to discharge air from said wet side into said conduit at a location remote from said dry side ~~outlet~~ and outside said wet side, and said conduit being adapted to discharging the resulting combined stream of air into said interior at a site different from said location.

22.(previously presented): An air conditioning assembly of claim 21 wherein said dry side inlet is configured to receive air from said interior.

23.(cancelled):

24.(currently amended): An air conditioning assembly of claim 21 wherein said ~~shell~~ wet side inlet and said ~~tube~~ dry side inlet being configured to receive air from said interior.

25.(previously presented): An air conditioning assembly of claim 21 including a thermally insulated case member enclosing said heat exchanger, ~~said case member being thermally insulated~~.

26.(cancelled)

27.(currently amended): An air conditioning assembly of claim 21 ~~including adapted to~~
cooling an object ~~by placing said object~~ placed in heat exchanging relationship with said water
source.

28.(currently amended): An air conditioning system for the interior of a structure in which
there is a mass of ambient air, said air conditioning system including a heat exchanger, said heat
exchanger including a wet side in heat exchanging relationship with a dry side, said air
conditioning system comprising:

forcing air through said dry side to produce a stream of cooled air;

forcing air ~~from a plurality of sources~~ through said wet side ~~to create turbulence~~, and
maintaining a mass of distributed water on said wet side to produce a stream of humidified air;

allowing said streams of cooled and humidified air to produce a combined mass of air in a
confined space at a location remote from said dry side and substantially outside of said wet side,
and allowing said combined mass of air to discharge into said interior at a site remote from said
location; and,

operating said air conditioning system at a rate of water consumption that is less than
approximately 10 percent that of a direct evaporative cooler wherein a single stream of air
passes through a moist environment and is cooled and humidified by the evaporation of water,
said direct evaporative cooler being operated under substantially the same external conditions;
and.

~~allowing said streams of cooled and humidified air to produce a combined mass of air in a
confined space at a location remote from said dry side, and allowing said combined mass of air
to discharge into said interior~~

29.(currently amended): An air conditioning system of claim 28 including operating said air conditioning system at a rate of water consumption that is less than approximately 5 percent of that of a said direct evaporative cooler ~~operated under substantially the same external conditions.~~

30.(previously presented): A cooling assembly comprising:
a heat exchanger, said heat exchanger including a wet side in heat exchanging relationship with a dry side;
a first air moving member adapted to moving air through said dry side to produce a cooled stream of air;
a water supply system air humidifyingly associated with said wet side;
a plurality of air moving members adapted to moving air from different sources through said wet side to produce a mass of moist turbulent air on said wet side, said air moving members requiring electrical power for their operation;
a secondary battery system, said secondary battery system being adapted to supplying all of said electrical power; and
a solar energy harvesting system chargingly associated with said secondary battery system.

31.(previously presented): An air conditioning assembly for cooling the interior of a structure comprising:

 a heat exchanger, said heat exchanger including a wet side in heat exchanging relationship with a dry side;

 a first air moving member adapted to moving air through said dry side to produce a cooled stream of air;

 a water supply system air humidifyingly associated with said wet side;

 a plurality of air moving members adapted to moving air from different sources through said wet side to produce a mass of moist turbulent air on said wet side, said first and second air moving members and said water supply system all requiring electrical power for their operation, said air conditioning assembly being adapted to combining said cooled and moist turbulent streams of air in a confined space and discharging said combined streams of air into said interior;

 a secondary battery system, said secondary battery system being adapted to supplying all of said electrical power; and

 an ambient energy harvesting system chargingly associated with said secondary battery system.

32.(original): An air conditioning assembly of claim 31 wherein said ambient energy harvesting system comprises a solar cell.

33.(original): An air conditioning assembly of claim 31 wherein said ambient energy harvesting system comprises a wind turbine.

34.(currently amended): An air conditioning system for the interior of a structure in which there is a mass of ambient air, said air conditioning system including a heat exchanger, said heat exchanger including a wet side in heat exchanging relationship with a dry side, said air conditioning system comprising:

forcing air through said dry side to produce a stream of cooled air;

forcing air ~~from a plurality of sources~~ through said wet side and maintaining a mass of distributed liquid water on said wet side to produce a stream of humidified air;

discharging said stream of humidified air into said stream of cooled air at a location remote from said dry side and substantially outside of said wet side to produce a combined mass of air at said location, and allowing said combined mass of air to discharge into said interior at a site substantially spaced from said location;

operating said air conditioning system at a rate of water consumption that is less than approximately 10 percent that of a direct evaporative cooler wherein a single stream of air passes through a moist environment and is cooled and humidified by the evaporation of water, said direct evaporative cooler being operated under substantially the same external conditions; and

harvesting ambient energy and operating said air conditioning system solely on the resulting harvested ambient energy.

35.(original): An air conditioning system of claim 34 wherein a secondary battery system is poweringly associated with said heat exchanger and said harvested ambient energy is applied to charging said secondary battery system.

36.(currently amended): A process of air conditioning the interior of a structure, said structure being located within an exterior environment, said process comprising:

selecting a time when said exterior environment exhibits a temperature in excess of approximately 100 degrees Fahrenheit and a relative humidity of less than approximately 30 percent;

selecting a heat exchanger having a wet side in heat exchanging relationship with a dry side, and locating said heat exchanger in air conditioning association with said interior;

establishing a mass of air humidifying distributed water on said wet side;

establishing a ~~turbulent~~ flow of air ~~from a plurality of sources~~ through said wet side in contact with said mass of distributed water, and recovering a resulting stream of moist air;

establishing a flow of air through said dry side and recovering a resulting stream of cooled air;

injecting said stream of moist air into said stream of cooled air at a location remote from said dry side and outside of said wet side to form a stream of combined air;

conveying said stream of combined air to a site in said interior of a structure that is different from said location and allowing said stream of combined air to discharge into said interior at said site;

harvesting ambient energy and applying the resultant harvested energy to establishing ~~said mass and~~ at least one of said mass or said flows;

operating said air conditioning system at a rate of water consumption that is less than approximately 10 percent that of a direct evaporative cooler wherein a single stream of air passes through a moist environment and is cooled and humidified by the evaporation of water, said direct evaporative cooler being operated under substantially the same external conditions; and

maintaining a temperature in said interior of less than approximately 85 degrees Fahrenheit and a relative humidity of no more than approximately twice that of said exterior environment.

37.(currently amended): A process of claim 36 including selecting a time when said exterior environment exhibits a temperature in excess of 110 degrees Fahrenheit and a relative humidity of less than about 25 percent.

38.(currently amended): A process of claim 36 including selecting a time when said exterior environment exhibits a temperature in excess of 110 degrees Fahrenheit and a relative humidity of less than about 25 percent, and operating said air conditioning system at a rate of water consumption that is less than approximately 5 percent that of a said direct evaporative cooler ~~operated under substantially the same external conditions.~~

39. (cancelled)

40.(currently amended): An air conditioning system for the interior of a structure, said air conditioning system including a heat exchanger, said heat exchanger having a shell side and a tube side in heat exchanging relationship with one another, said air conditioning system comprising:

forcing air through said tube side to produce a stream of cooled air;

forcing ~~a plurality of an~~ air stream ~~streams from different directions~~ through said shell side and maintaining a mass of finely divided water on said shell side to produce a stream of humidified ambient air; and

combining said streams of cooled and humidified air at a location that is remote from said tube side and substantially outside of said shell side to produce a combined mass of air in a confined space, and discharging said combined mass of air into said interior at a site that is different from said confined space.

41.(currently amended): An air conditioning system of claim 40 including drawing said ~~ambient~~ air from said interior into said tube side.

42.(previously presented): An air conditioning assembly for cooling the interior of a structure comprising:

 a heat exchanger, said heat exchanger having a shell side and a tube side;

 a first air moving member adapted to move air through said tube side to produce a cooled stream of air;

 a liquid dispensing member on said shell side adapted to distribute liquid substantially throughout said shell side;

 a liquid sump element associated with said shell side and adapted to receive said liquid from said shell side and to make said liquid available to said liquid dispensing member;

 a plurality of air moving members adapted to move air through said shell side from different directions to produce a turbulent mass of air on said shell side, said turbulent mass of air including a vapor phase of said liquid; and

 conduit members adapted to convey said cooled stream of air and said turbulent mass of air from said heat exchanger to an intersection and from said intersection to said interior.

43.(original): An air conditioning assembly of claim 42 including a power source, said power source including solar panels.

44.(cancelled)

45.(previously presented): An air conditioning installation for use in low humidity high temperature environments comprising:

 a structure having an interior containing ambient air;

 a tube and shell heat exchanger air conditioningly associated with said interior, said tube and shell heat exchanger including a tube side and a shell side, said tube side being adapted to being dry, and said shell side being adapted to being wet;

 a tube side air moving member air movingly associated with said tube side and adapted to move said ambient air through said tube side and to provide a tube side air stream;

 a plurality of shell side air moving members air movingly associated with said shell side, and adapted to move said ambient air through said shell side from different directions, to produce a turbulent mass of air on said shell side, and to provide a shell side air stream;

 a water supply system wettingly associated with said shell side, said water supply system including a sump, a water emitting element on said shell side, and a water pump member circulatingly positioned between said sump and said water emitting element, said water supply system being adapted to maintain said shell side wet with water; and

 an air conduit system air receivingly associated with said tube and shell sides and adapted to combine said tube side and shell side air streams into a combined air stream at a location remote from said dry side and to discharge said combined air stream into said interior.

46.(cancelled)